US 010043

TASK MANAGEMENT SYSTEM

Field of the Invention:

[0001] The present invention generally relates to a system for managing scheduled tasks, and more particularly to a task management system wherein reminders to perform a scheduled task requiring the movement of an object are generated and cancelled based on the movement or location of the object. The invention relates in particular but not exclusively to a home network environment

Background of the Invention:

[0002] Many routine tasks performed at home or at work involve the periodic or scheduled movement of one or more objects from one location to another. For example, bills received by mail must be paid by a certain date. The bill is physically moved from the "in"-tray to the "out"-tray. As another example, most residential garbage collection occurs on a particular day of the week. On that day, the resident must move the garbage container and container for recyclables from a first location (e.g., near the back door) to a second location (e.g., the curb). The resident may employ a variety of techniques to generate reminders to take out the garbage. In a very basic reminder system, the resident may write a note each week, a few days before garbage collection day, reminding the resident to take out the garbage. This system is inefficient because it requires the resident to (1) create the reminder, (2) perform the task, and (3) remove the reminder.

[0003] Alternatively, the resident could simply post a permanent reminder note somewhere around the house. This approach eliminates steps (1) (after the first week) and (3), but is undesirable because it provides no feedback indicating completion of the task. Unlike the reminder of the first system, which is removed after the garbage is taken to the curb, in the second system, the reminder is constantly present, eliminating much of its value. As garbage collection day approaches, the resident must recall in response to the constant reminder whether the task was completed that particular week. Moreover, other occupants of the home may waste energy checking the position of the garbage container or asking the resident primarily responsible for moving the container to the curb whether the task has been completed.

[0004] The resident may instead use an automatic reminder system, such as a home computer with scheduling software, or a personal digital assistant ("PDA"). Once programmed, such systems typically provide automatic reminders of upcoming tasks (e.g., to-do lists). These systems are deficient, however, because they lack an efficient reminder management scheme. Specifically, automatic systems either automatically remove the reminder after the due date passes, or maintain the reminder until the user manually removes it from the list. Automatic removal of a reminder may be highly undesirable. Often, action can be taken after the due date to either complete the task late, or to mitigate the effects of its incomplete status. Without a reminder, the incomplete status of the task may go unnoticed. Alternatively, systems which require the user to manually remove the reminder after completing the task are inefficient (like the weekly notes discussed above) because the user must remember to remove the reminder.

SUMMARY OF THE INVENTION:

[0005] The present invention provides a system for managing tasks involving the movement of an object. The system includes an indicator attached to the object, and a sensor for detecting the position or movement of the object, for use with a monitoring component, for generating and canceling in a user-interface reminders to perform the task based upon input from the sensor. In one embodiment of the invention, the indicator is, e.g., a radio frequency, passive device connected to the object, the sensor is a conventional proximity sensor positioned within the path of travel the object will follow when the task is performed, and the monitoring component is part of a home network linked to a PDA (Personal Digital Assistant). In another embodiment, two or more sensors are used to establish the position of the object at a first location (start location) and the position of the object at a second location (destination) and/or direction of movement of the object, rather than merely detect movement of the object past a location within the path of travel. In both embodiments, the sensors detect presence/absence of the object at predetermined locations and/or movement of the object (by sensing the indicator) when the task is being performed, and provide a signal to the monitoring component indicating that the task is being completed. The monitoring component then generates a response such as automatically removing the reminder to perform the task.

[0006] The reminders can be sent via the home network of the user, e.g., via a display monitor or an audio equipment. For example, an on-screen display is generated as a graphical overlay over a program being watched on a television, etc.

[0007] Herein incorporated by reference are the following patent documents:

- U.S. serial no. 09/635,549 (attorney docket US 000209) filed 8/10/00 for Eugene Shteyn for TOPICAL SERVICE PROVIDES CONTEXT INFORMATION FOR A HOME NETWORK. This document relates to making a consumer apparatus an intuitive component of a user-interface to a topical server. A specific user-interaction with the apparatus or its proxy on the home network causes a request to be sent to a specific server on the Internet based on a predefined URL. The home network receives a particular web page from the server with content information dedicated to the context of use of the apparatus.

- U.S. serial no. 09/635,548 (attorney docket US 000107) filed 8/10/00 for Eugene Shteyn and Paul Rankin for MOBILE MICRO PORTAL. This document relates to a geographic region with a network of beacons. Each beacon transmits a short-range facilitation signal for receipt on a user's mobile communication device. The facilitation signal initiates associating the facilitation signal with a service and conditionally alerts the user to the service via the device dependent on a user profile. The user-profile and the association between facilitation signal and service are user-programmable.

- U.S. serial no. 09/427,821 (attorney docket PHA 23,786) filed 10/27/00 for Rik Sagar for PDA HAS WIRELESS MODEM FOR REMOTE CONTROL VIA THE INTERNET. This document relates to combining a PDA with a wireless modem to enable remote control of CE equipment via the Internet and a local home server.

- U.S. serial no. 09/715,364 (attorney docket 008064) filed 11/17/00 for Pieter van der Meulen for INTELLIGENT APPLIANCE HOME NETWORK. This document relates to using the instantaneous power consumption of an appliance determine the status of the appliance, from which further actions may be taken. Most appliances have a characteristic power consumption pattern that can be used to determine the state of operation of the appliance. An electric coffee pot, for example, consumes high power substantially continuously during the brewing state, then reduces its power level, or power duration, or both, while keeping the pot warm, then terminates its power consumption when it is turned off. In like manner, the power consumption patterns of other appliances, such as toasters, washing machines, dryers, and so on may also be used to determine the state of each appliance. The communicated state may be used by a home-automation system to effect a variety of actions, including notifying the user, terminating the available power to the appliance, initiating an action by another appliance, and so on.

- U.S. serial no. 09/519,546 (attorney docket US 000014) filed 3/6/00 for Erik Ekkel et al., for PERSONALIZING CE EQUIPMENT CONFIGURATION AT SERVER VIA WEB-

ENABLED DEVICE. This document relates to facilitating the configuring of CE equipment by the consumer by means of delegating the configuring to an application server on the Internet. The consumer enters his/her preferences in a specific interactive Web page through a suitable user-interface of an Internet-enabled device, such as a PC or set-top box or digital cellphone. The application server generates the control data based on the preferences entered and downloads the control data to the CE equipment itself or to the Internet-enabled device.

BRIEF DESCRIPTION OF THE DRAWINGS:

[0008] The invention is further explained below, by way of example and with reference to the accompanying drawings wherein:

[0009] Figure 1 is a schematic diagram of a task management system according to the present invention; and

[00010] Figure 2 is a schematic diagram of another embodiment of a task management system according to the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[00011] The embodiments of the invention described herein are not intended to be exhaustive or to limit the invention to the precise forms disclosed. Rather, the embodiments selected for description have been chosen to enable one skilled in the art to practice the invention.

[00012] The invention relates to a task management system for use in a home environment. The system manages a task scheduled in advance and involving a user moving a physical object. The system comprises a sensor for sensing a presence of the object; and a scheduler for sending a task-related message to the user under control of the sensor. The system comprises a tag being associated with the object and being remotely detectable by the sensor. The system preferably has software for enabling the user to program the scheduler, e.g., as to which tasks to be managed and the time schedule for messaging. The system may also receive data via a data network, e.g., the Internet, from a remote server for programming the scheduler. The system preferably manages multiple tasks involving the user moving multiple objects. Tasks can be conditionally interrelated, e.g., IF task #1 THEN task #2 ELSE task #3. Preferably, the system is for being incorporated in a home network as a functional part thereof.

[00013] A tag in the invention is meant for being associated with an object within a home environment and for cooperating with a sensor for remote sensing of a presence of the

object via the tag. Preferably, the tag is programmable for identifying the object via the sensor.

[00014] The invention also relates to software for use on a home network. The software receives first input data associated with a presence or absence of an object, and second input data representative of a scheduled task that involves the user moving the object. The software comprises a scheduler application for generating output data for alerting the user to the task.

[00015] Referring to Figure 1, a task management system 10 according to the present invention generally includes a sensor 14, and an indicator 16 attached to an object 18 such as with fasteners, adhesives, magnetic strip, velcro, etc., Sensor 14 cooperates with indicator 16 and a monitoring component or home network 12 including a program 19. Indicator 16 comprises, e.g., a radio frequency, passive device for identifying the object, a barcode tag, or another indicator suitable for enabling sensor 14 to determine at least the presence of object 18 if the latter is within range of sensor 14. Indicator 16 may be programmable to include information for identifying a particular object 18 and discriminating between multiple indicators associated with different objects. Indicator 16 may be re-usable with different objects by re-programming. Sensor 14 comprises, in this example, a radio-frequency proximity sensor which emits a sensor signal 20 to detect the presence of indicator 16 according to principles well-known in the art. Sensor 14 detects indicator 16 when object 18 is in position "B," and provides a signal to network 12 on line 22 indicating that object 18 has been moved between position "A" at a first location 24 and position "C" at a second location 26. Depending on the scheduled task involving moving object 18, sensor 14 preferably sends signal 20 only when monitoring the presence of object 18 is relevant. The timing or repetition rate of sensing object 18 is preferably user-programmable.

[00016] In one mode of operation, software 19 causes network 12 of system 10 to display a message or reminder of a task involving the movement of object 18 past sensor 14 (e.g., from position "A" to second position "B"). Program 19 includes a messaging routine for generating such messages. The messaging routine may receive scheduling data from a remote service, for example, over an Internet connection to network 12. For example, a community service may broadcast over the Internet the, possibly dynamic, schedule of the garbage truck per zone or street. The schedule is taken as input to system 10 to create the necessary reminders. When object 18 is moved past sensor 14, sensor 14 detects the presence of indicator 16, and provides a first signal to network 12. When object 18 is moved out of proximity of sensor 14, sensor 14 provides a second signal (e.g., the absence of the first

signal) to network 12 on line 22. Program 19 includes a feedback routine, which interprets these signals as an indication of completion of the task (movement of object 18 from position "A" to position "B"), and generates a response such as automatically removing the reminder. If the feedback routine had not received these signals, then it generates a different response. Accordingly, the user need not manually remove reminders as tasks are completed. Moreover, the user does not receive unnecessary reminders to perform already completed tasks.

[00017] A practical application of system 10 is the garbage collection example mentioned above. In this example, home network 12 comprises a computer programmed to provide reminders of daily tasks. Object 18 is a garbage container, and first location 24 is near the back door of the resident's home, whereas second location 26 is near the curb or other destination location of the garbage container. Sensor 14 is mounted on a gate through which the resident must pass to move the garbage container from the back door to the curb. The day before garbage collection day, network 12 generates a "Take Out the Trash" reminder. Resident #1 sees the reminder early in the day, and moves the garbage container from location 24 near the back door to location 26 at the curb. Sensor 14 detects indicator 16 (mounted to the garbage container 18) as the resident passes through the gate with the container. Sensor 14 provides a signal on line 22 to network 12 to indicate movement of the garbage container. Network 12 determines from receipt of the signal on line 22 that the task has been completed, and removes the reminder. Later in the day, when resident #2 checks the daily reminders, the "Take out the Trash" reminder is not displayed. Resident #1 did not need to manually remove the reminder, and resident #2 did not need to verify completion of the task by discussing the matter with resident #1. The act of performing the task automatically updated the reminder information.

[00018] Referring now to Figure 2, another embodiment of a task management system according to the present invention is shown. System 100 is substantially similar to system 10. Accordingly, the reference number designations of like components have been retained, but increased by 100. System 100 generally includes a monitor 112, a pair of sensors 114A, 114B, and an indicator 116 attached to an object 118. Monitor 112 is shown as including a home network system 113, which is connected for synchronization with a PDA 115 as indicated by line 117. PDA 115 may also be capable of wireless communications with network 113. Network 113 includes a software program 119 for carrying out the variety of functions described below.

[00019] Sensor 114A comprises a conventional proximity sensor, which emits a sensor signal 120A toward a first location 124 to detect the presence of indicator 116. If indicator 116 (and therefore object 118) is present at first location 124, then sensor 114A outputs a first signal to monitor 112 as indicated by line 122A. If indicator 116 is not present at location 124, then sensor 114A outputs a second signal to monitor 112. Similarly, sensor 114B emits a sensor signal (not shown) toward a second location 126 to detect indicator 116. Sensor 114B also outputs (line 122B) a first signal to a feedback routine of program 119 if indicator 116 is present at location 126, and a second signal if indicator 116 is not present.

[00020] Again using the garbage collection example, it should be apparent that system 100 provides additional intelligence (as compared to system 10) by sensing the direction of movement of the garbage container (object 118). In this example, first location 124 is a gate through which the resident must pass to move the garbage container to the curb, and second location 126 is a portion of a walkway leading to the curb location at which the garbage container is normally left for pick-up. Thus, the day before collection day, a messaging routine of program 119 generates a "Take Out the Trash" reminder which is communicated to PDA 115. When the resident moves the garbage container through the gate, sensor 114A detects indicator 116, and provides a first signal to network 113. When the resident (and indicator 116) moves along the walkway leading to the curb, sensor 114B also provides a first signal to network 113. Upon receipt of both of these first signals in this order, the feedback routine of program 119 determines that object 118 has been moved from near the back door to the curb. Accordingly, the feedback routine of program 119 automatically cancels the "Take Out the Trash" reminder.

[00021] The following week on the day before collection day, the messaging routine again automatically creates a "Take Out the Trash" reminder. If, however, the garbage container were mistakenly left at the curb the previous week, the reminder may serve to prompt the resident to retrieve the container, fill it at the back door with the garbage accumulated over the previous week, and return it to the curb. Using single sensor system 10 of Figure 1, as the container is moved past sensor 14 (upon returning it to the back door), sensor 14 provides a signal to monitor 12 canceling the outstanding "Take Out the Trash" reminder. If the resident puts off the task of returning the container (now filled with accumulated garbage) to the curb, the resident must remember to complete the task without the benefit of a reminder.

[00022] Using double sensor system 100 of Figure 2, as object 118 is moved first past sensor 114B and then past sensor 114A (upon the return trip to the back door), program 119

can readily determine that object 118 has not been moved in the required direction to complete the task. Accordingly, the outstanding reminder remains present at PDA 115. Only after object 118 is moved past sensor 114A and sensor 114B, in that order, will program 119 automatically cancel the outstanding reminder.

[00023] First location 124 and second location 114B may be destination locations (i.e., the back door and the curb) as opposed to locations within the path of travel of object 118. Moreover, program 119 may readily be modified to generate a "Take Out the Trash" reminder only if the garbage container is present at first location 124 (the back door) at the predetermined time of the week. Whenever the container is present at second location 126 (the curb), program 119 may continuously provide a "Return the Container" reminder, which is automatically removed by moving the container out of proximity of sensor 114B, and into the proximity of sensor 114A. Program 119 could also provide a "Locate the Container" reminder if the container is not located at either first location 124 or second location 126.

[00024] In another example, object 118 is a monthly bill, first location 124 is an in-basket, and second location 126 is an out-basket. Indicator 116 is attached to bill 118 by the sender or processor, and contains information, for example, regarding the identification of the sender, the amount owed, and the due date. Alternatively, indicator 116 includes information identifying object 118 which is associated with other information relating to object 118 stored, for example, in memory of network 113 and accessed by a memory accessing routine of program 119 upon receipt of a first signal from sensor 114A. Sensor 114A is mounted adjacent the in-basket, and reads this information from indicator 116 when the bill is deposited in the in-basket. Sensor 114A then includes this information as part of the first signal provided to network 113. Each of a plurality of bills received may include an identifier 116 providing information unique to the bill, which ultimately results in a particularized reminder for the bill. Network 113 may respond to receipt of the first signal from sensor 114A by immediately generating a reminder to pay the bill by the due date. Alternatively, network 113 may delay transmission of such a reminder to PDA 115 until some pre-determined number of days before the due date. When the user removes the bill from the in-basket to pay the amount due, and deposits the bill into the out-basket, sensor 114B detects indicator 116 and provides a signal to network 113 indicating that the bill has been paid. The reminder to pay is then automatically canceled.

[00025] A variety of different reminder schemes are possible using system 100. For example, the feedback routine of program 119 may generate a "Pay Bill" reminder upon receipt of the first signal from sensor 114A when the bill is deposited into the in-basket.

Program 119 may generate a "Bill Being Processed" message (and delete the "Pay Bill" reminder) in response to the second signal from sensor 114A when the bill is removed from the in-basket. Program 119 may then generate a "Mail Paid Bill" reminder (and delete the "Bill Being Processed" message) in response to the first signal from sensor 114B when the bill is deposited into the out-basket after processing. Finally, program 119 may remove all reminders relating to the bill upon receipt of the second signal generated by sensor 114B when the bill is removed from the out-basket.

[00026] It should be understood that system 100 could also readily be incorporated into a semi-automatic process for paying bills or performing other similar tasks. Program 119 may, for example, automatically arrange payment of the bill over the Internet when the bill is placed in the in-basket, and post a reminder to the user on PDA 115 requesting approval of the payment. When the user removes the bill from the in-basket to verify the payment information, sensor 114A provides a second signal to the feedback routine of program 119. Program 119 may be adapted to execute the payment only upon receipt of both the second signal from sensor 114A (indicating that the bill has been removed for inspection), and a signal from PDA 115 indicating the user's approval of the payment.

[00027] In yet another example, object 118 is a textbook, first location 124 is a student's backpack. Indicator 116 is attached to textbook by the student or the student's parent or library, and contains information, for example, regarding the school subject, book title, etc. Sensor 114a is mounted on the backpack and reads the information from indicator 116 when the book is put into the backpack. Sensor 114a then includes this information as part of the signal provided to network 113 or directly to monitor 112. Monitor 112 has access to the information enabling the system to associate the student's schedule with school subjects and a corresponding book list. In addition the system may contain information about corresponding homework notebooks and other essential school items (school set). The system is set up so as to track the completeness of the school set with regards to the next day's subject list by a certain time of the previous day ("Check your backpack" reminder). When all the items from the school set are present, the system cancels the "Check your backpack" reminder. Otherwise it informs the student or his parents about items missing from the backpack.

[00028] Although the present invention has been shown and described in detail, the same is to be taken by way of example only and not by way of limitation. Numerous changes can be made to the embodiments described above without departing from the scope of the invention. This application is therefore intended to cover any variations, uses, or adaptations

of the invention using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains.